IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)
)
DIETER C. GRUENERT, ET AL.)
)
Serial No.: 08/487,799) Group Art Unit: 1804
)
Filed: June 7, 1995) Examiner: Unassigned
)
For: GENE THERAPY BY SMALL FRAGMENTS)
HOMOLOGOUS REPLACEMENT)

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Assistant Commissioner for Patents, Washington, D.C. 20231 on July 21, 1999.

Hana Verny (Reg. No. 30,518)

INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. 1.97(b)

The information disclosure statement submitted herewith is being filed within three months of the filing date of the application and before the mailing date of a first Office action on the merits, whichever event occurs last. 37 CFR 1.97(b).

The citations listed on the attached PTO 1449, along with the copies of enclosed references, provide the background and may be material to the examination of the above-identified application and are, therefore, submitted in compliance with the duty of disclosure in 37 C.F.R. 1.56, 1.97 and 1.98.

Some of the references may have been disclosed in the application and provide either the background for the invention or support for practicing it. The designation of references corresponds to the designation given in the Form 1449.

Reference A. U.S. Patent 4,950,599 issued August 21, 1990 to Wolf Bertling.

Reference O. ERIC J. SORSCHER et al, Gene Therapy for Cystic Fibrosis Using Cationic Liposome Mediated Gene Transfer: A Phase I Trial of Safety and Efficacy in the Nasal Airway, Human Gene Therapy 5:1259-1277, October 1994

Reference P. JAMES M. WILSON et al, Gene Therapy of Cystic Fibrosis Lung Disease Using E1 Deleted Adenoviruses: A Phase I Trial, Human Gene Therapy 5:501-519, 1994

Reference Q. NATASHA J. CAPLEN et al, Liposome-mediated CFTR gene transfer to the nasal epithelium of patients with cystic fibrosis, Nature Medicine, Volume 1, Number 1, January 1995

Reference R. RICHARD M. BOUCHER et al, Gene Therapy for Cystic Fibrosis Using E1-Deleted Adenovirus: A Phase I Trial in the Nasal Cavity, Human Gene Therapy 5:615-639, 1994

Reference S. MITCHELL J. GOLDMAN et al, Gene therapy in a xenograft model of cystic fibrosis lung corrects chloride transport more effectively than the sodium defect, Nature Genetics, volume 9, February 1995

Reference T. JOE PALCA, The Promise of a Cure, Discover, pp 79-86, June 1994.

Reference U. JOSEPH ZABNER et al, Adenovirus-Mediated Gene

Transfer Transiently Corrects the Chloride Transport Defect in Nasal Epithelia of Patients with Cystic Fibrosis, Cell, Vol 75, pp 207-216, October 22, 1993.

Reference V. TERRENCE R. FLOTTE et al, An improved system for packaging recombinant adeno-associated virus vectors capable of in vivo transduction, Gene Therapy 2, pp 29-37, 1995.

Reference W. Gene therapy for cystic fibrosis, Nature Medicine, Volume 1, Number 3, pp 182, March 3, 1995.

Reference X. DEBORAH ERICKSON, Genes to Order, Scientific American, pp 112-114, June 1992.

Reference Y. JAMES M. WILSON, Vehicles for gene therapy, Nature, Vol 365, pp 691-692, October 21, 1993.

Reference Z. ERIC ALTON & DUNCAN GEDDES, A mixed message for cystic fibrosis gene therapy, Nature Genetics, volume 8, pp 8-9, September 1994.

Reference AA. JAMES J. LOGAN et al, Cationic lipids for reporter gene and CFTR transfer to rat pulmonary epithelium, Gene Therapy 2, pp 38-49, 1995.

This Information Disclosure Statement under 37 C.F.R. 1.56, 1.97, and 1.98 is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that any one or more of these citations constitutes prior art.

This application relies, under 35 U.S.C. § 120, on the earlier filing date of prior application Serial No. 07/933,711, filed on August 21, 1992.

Copies of the Information Disclosure Statement and form PTO 1449 submitted in the prior application are enclosed. The references in the enclosed prior application's PTO 1449 were submitted to and/or cited by the Office in the prior application and therefore are not required to be provided in this application.

If fees are required with the filing of these documents, the Commissioner is authorized to charge such fees to Deposit Account No. 16-1331.

Respectfully submitted,

Date: _____

Hana Verny (Reg. No. 30,518)
Attorney of Record

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UC Case No. 92-070-3

FOR PTO-1449 (Modified)

LIST OF PATENTS AND PUBLICATIONS FOR APPLICANTS INFORMATION DISCLOSURE STATEMENT

(Use several sheets if necessary)

ATTY. DOCKET NO.	SERIAL NO.
480.18-1 (HV)	08/487,799
APPLICANT	DIETER GRUENERT, ET AL
FILING DATE June 7, 1995	GROUP 1804

REFERENCE DESIGNATION — U.S. PATENT DOCUMENTS

EXAMINER INITIAL										DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	A	4	9	5	0	5	9	9		8/21/90	BERTLING	435	172.3	1/29/87

FOREIGN PATENT DOCUMENTS

										DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO

OTHER — ART (Including Author, Title, Date, Pertinent Pages, Etc.)

	O		ERIC J. SORSCHER et al, Gene Therapy for Cystic Fibrosis Using Cationic Liposome Mediated Gene Transfer: A Phase I Trial of Safety and Efficacy in the Nasal Airway, Human Gene Therapy 5:1259-1277, October 1994
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	Q		NATASHA J. CAPLEN et al, Liposome-mediated CFTR gene transfer to the nasal epithelium of patients with cystic fibrosis, Nature Medicine, Volume 1, Number 1, January 1995
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	T		JOE PALCA, The Promise of a Cure, Discover, pp 79-86, June 1994
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	W		Gene therapy for cystic fibrosis, Nature Medicine, Volume 1, Number 3, pp 182-184, March 3, 1995
	X		DEBORAH ERICKSON, Genes to Order, Scientific American, pp 112-114, June 1992
	Y		JAMES M. WILSON, Vehicles for gene therapy, Nature, Vol 365, pp 691-692, October 21, 1993

EXAMINER	DATE CONSIDERED

EXAMINER: **Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.**

FOR PTO-1449 (Modified)

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	Z		ERIC ALTON & DUNCAN GEDDES, A mixed message for cystic fibrosis gene therapy, Nature Genetics, volume 8, pp 8-9,
			September 1994
	AA		JAMES J. LOGAN et al, Cationic lipids for reporter gene and CFTR transfer to rat pulmonary epithelium, Gene Therapy 2,
			pp 38-49, 1995

EXAMINER	DATE CONSIDERED

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Docket No. UCSF-0008

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Gruenert, D.C., et al.	:	Appl. Ref. No: UC 92-070-1
Serial No: 07/933,471	:	Group Art Unit:
Filed: August 21, 1992	:	

For: COMPOSITION AND METHOD FOR ALTERING DNA SEQUENCES BY HOMOLOGOUS RECOMBINATION

INFORMATION DISCLOSURE STATEMENT

ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
WASHINGTON, D.C. 20231

Sir:

Pursuant to 37 C.F.R. 1.97-1.99, and 1.56 Applicants hereby make of record references that were cited in the Background section of the application, along with a new reference and a 1449-PTO form listing them. Copies of the references are enclosed.

10/20/99
Date of Deposit

K Bellenzi
Signature

I hereby certify that this paper or fee is being deposited with the United States Postal Service, first class service on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington D.C. 20231.

REMARKS

The Orban, P.C., et al. reference describes the formation of transgenic mice carrying plasmids with bacteriophage recombinase and β-galactosidase-*loxP* sequences. The recombination of the β-galactosidase gene was shown in the presence of the expressed recombinase Cre gene.

The references cited in the Background section of the application are as follows.

The Rosenfeld, M.A., et al. reference describes the non-site specific transfer of a normal cystic fibrosis (CF) transmembrane conductance regulator (CFTR) gene to airway epithelium using a replication-deficient recombinant adenovirus (Ad) vector.

The Capecchi, M. R. reference describes drug selection techniques which may be effective to obtain homologous recombination between DNA sequences residing in the chromosome and cloned DNA sequences (gene targeting).

The Boggs, S.S. reference reviews advances in DNA transfection techniques, stem cell purification and sequence detection as approaches to targeted gene modification of hematopoietic stem cells.

The Thomas, K.R. and Capecchi, M.R. reference describes the function of the int-1 gene in the mouse determined by disrupting one of the two int-1 alleles in chimeric mouse embryo-derived stem cells using positive-negative drug selection.

The Koller, B.H. and Smithies, O. reference describes the inactivation, by gene targeting, by a plasmid-carried DNA of the endogenous β_2-microglobulin gene in a mouse embryonic stem cell line.

The Mansour, S.L., et al., reference describes a general method of positive and negative selection that enriches 2,000-fold for those cells that contain a targeted mutation.

The Accili, D. and Taylor, S.I. reference describes a role of the insulin receptor in determining adipocyte differentiation of the mouse cell line 3T3-L1. A vector-carried mutation inactivates the insulin receptor gene introduced by homologous recombination.

The Thompson, S., et al., reference describes a vector-mediated correction of a deletion mutation in the HPRT-deficient mouse embryonic stem (ES) cell line E14TG2a.

The Koller, B.H., et al., reference describes an offspring of chimeric mice carrying a vector-corrected DNA sequence of a mutant hypoxanthine phosphoribosyltransferase gene. The gene had been corrected in vitro by DNA vector hybrid molecules injected into stem cells.

The Adair, G.M., et al. reference describes the development of a system that permits the analysis of targeted homologous recombination with a plasmid-carried APRT sequence.

The Kucherlapati, R.S., et al. reference describes the incubation of two plasmids containing non-complementing and non-reverting deletions in a bacterial

phosphotransferase gene conferring resistance to neomycin (Neo^r) with human cell extracts, and the use of the mixtures for transforming recombination-deficient (recA$^-$) Escherichia coli cells.

The Campbell, C.R., et al. reference describes the modification of a plasmid gene by homologous recombination techniques.

The Lin, F., et al. reference describes the construction of a phage λ and plasmid DNA substrates (λtk^2 and ptk^2) containing two defective herpes virus thymidine kinase (tk) genes that can be used to detect homologous recombination during the transfer of DNA into mouse L cells deficient in thymidine kinase activity.

The Moser, H.E. and Dervan, P.B. reference describes the attachment of a homopyrimidine oligodeoxyribunucleotide to corresponding homopyrimidine-homopurine tracts within large double-stranded DNA by triple helix formation.

The Ferrin, L.J. and Camerini-Otero, R.D. reference describes a method for sequence-specific cleavage of large segments of DNA using single strand DNAs that bind in the presence of RecA to create additional cleavage sites.

The West, S. reference reviews the role of RecA protein in bacterial recombination and the enzyme properties of RecA.

The Hsieh, P. and Camerini-Otero, R.D. reference describes DNA strand exchange activities of DNA from nuclear extracts of HeLa cells or Drosophila melanogaster embryos. The extracts have recombinase activity which promotes pairing without melting of DNA.

The Hsieh, P., et al. reference describes recombinases that form joint molecules over very short regions of homology. The DNA triple helices are stable on removal of RecA protein.

The Rao, B.J., et al. reference describes the promotion by RecA protein of homologous pairing and strand exchange via long three-stranded DNA intermediates. Once formed in natural DNA such triplex structures are stable even when the RecA protein has been removed.

Applicants submit that the present invention is patentably distinguishable over the art of record and any other art known to applicants up to the present time.

Respectfully submitted,
FISHER & AMZEL

10/19/92
Date

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10/20/92
Date of Deposit

Signature

I hereby certify that this paper or fee is being deposited with the United States Postal Service "First Class Mail" service on the date indicated above and is addressed to the Commission of Patents and Trademarks, Washington D.C. 20231.

Form PTO-1449 (REV. 2-83) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO. UCSF-0008 SERIAL NO. 07/933,471

Y.R: UC 92-070-1

APPLICANT: Gruenert, D., et al.

FILING DATE Aug. 21, 1992 GROUP

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use several sheets if necessary)

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE

FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANLATION YES	TRANLATION NO

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

A Orban, P.C., et al., "Tissue- and Site-Specific DNA Recombination in Transgenic Mice", P.N.A.S., USA 89:6861-6865 (1992).

B Rosenfeld, M.A., et al., "In Vivo Transfer of the Human Cystic Fibrosis Transmembrane Conductance Regulator Gene to the Airway Epithelium", Cell 68:143-155 (1992).

C Capecchi, M.R., "Altering the Genome by Homologous Recombination", Science 244:1288-1292 (1989).

D Boggs, S.S., "Targeted Gene Modification for Gene Therapy of Stem Cells", International J. of Cell Cloning 8:80-96 (1990).

E Thomas, K.M. and Capecchi, M.r., " Targeted Disruption of the Murine int-1 Proto-Oncogene Resulting in Severe Abnormalities in Midbrain and Cerebellar Development", Nature, 346:847-850 (1990).

F Koller, B.H., "Inactivating the β_2-Microglobulin Locus in Mouse Embryonic Stem Cells by Homologous Recombination", P.N.A.S. USA 86:8932-8935 (1989).

G Mansour, S.L., et al., "Disruption of the Proto-Oncogene int-2 in Mouse Embryo-Derived Stem Cells: a General Strategy for Targeting Mutations to Non-Selectable Genes", Nature 336:348-352 (1988).

H Accili, D. and Taylor, S.I., "Targeted Inactivation of the Insulin Receptor Gene in Mouse 3T3-L1 Fibroblasts Via Homologous Recombination", P.N.A.S. USA 88:4708-4712 (1991).

I Thompson, S., et al., "Germ Line Transmission and Expression of a Corrected HPRT Gene Produced by Gene Targeting in Embryonic Stem Cells", Cell 56:313-321 (1989).

J Koller, B.H., et al., "Germ-Line Transmission of a Planned Alteration Made in a Hypoxanthine Phosphoribosyltransferase Gene by Homologous Recombination in Embryonic Stem Cells", P.N.A.S. USA 86:8927-8931 (1989).

EXAMINER DATE CONSIDERED

Form PTO-1449 (REV. 2-83)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO.	SERIAL NO.
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K Adair, G.A., et al., " Targeted Homologous Recombination at the Endogenous Adenine Phophoribosyltransferase Locus in Chinese Hamster Cells", P.N.A.S USA 86:4574-4578 (1989).

L Kucherlapati, R.S., et al., "Homologous Recombination Catalyzed by Human Cell Extracts", Mol. and Cell. Biol. Vol. 5 4:714-720 (1985).

M Campbell, C.R., et al., "Homologous Recombination Involving Small Single-Stranded Oligonucleotide in Human Cells", The New Biologist Vol 1 2:223-227 (1989).

N Lin, F., et al., "Model for Homologous Recombination During Transfer of DNA into Mouse L Cells: Role for DNA Ends in the Recombination Process", Mol. and Cell. Biol. Vol 4 6:1020-1034 (1984).

O Moser, H.E. and Dervan, P.B., "Sequence-Specific Cleavage of Double Helical DNA by Triple Helix Formation", Science 238: 645-650 (1987).

P Ferrin, L.J. and Camerini-Otero, R.D., "Selective Cleavage of Human DNA: RecA-Assisted restriction Endonuclease (RARE) Cleavage, Science 254:1494-1497 (1991).

Q West, S.C., "Enzymes and Molecular Mechanisms of Genetic Recombination", Annu. Rev. Biochem. 61:603-640 (1992).

R Hsieh, P. and Camerini-Otero, R.D., "Formation of Joint DNA Molecules by Two Eukaryotic Strand Exchange Proteins Does Not Require Melting of a DNA Duplex", The J. of Biol. Chem. Vol. 264 9:5089-5097 (1989).

S Hsieh, P., et al., "Pairing of Homologous DNA Sequences by Proteins: Evidence for Three-Stranded DNA", Genes & Development pp. 1951-1963 (1990).

T Rao, B.J, et al., "Stable Three-Stranded DNA Made by RecA Protein", P.N.A.S. USA 88:2984-2988 (1991).

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